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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,594	03/10/2004	Yusuke Sakagami	9319A-000724	4710

27572 7590 10/03/2006

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EXAMINER

MRUK, GEOFFREY S

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 10/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/797,594

Applicant(s)

SAKAGAMI ET AL.

Examiner

Geoffrey Mruk

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) 1-26 and 42-48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 27-41 and 49-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 3/10/04 9/24/04 10/14/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Claims 1-26 and 42-48 withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 14 July 2006.

Applicant's election with traverse of Species II and Species II-A in the reply filed on 14 July 2006 is acknowledged. The traversal is on the ground(s) that all of the species are drawn to subject matter which are so related to each other that an undue burden would not be placed upon the Examiner by maintaining all of the species in a single application. This is not found persuasive because although there is no requirement to show separate classification in regards to an election of species, a burden does exist because a separate search would be required.

The requirement is still deemed proper and is therefore made FINAL.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed on 10 March 2004.

Drawings

The drawings were received on 26 July 2004 are accepted.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 27-35, 38-40, and 49-54 are rejected under 35 U.S.C. 102(b) as being anticipated by Yauchi et al. (US 5,500,657).

With respect to claim 27, Yauchi discloses a droplet ejection apparatus (Fig. 1) having a driving circuit (Fig. 2, element 6), a reciprocating mechanism (Fig. 9, element 53) and a plurality of droplet ejection heads each including a cavity filled with a liquid (Fig. 9, element 60), a nozzle communicated with the cavity (Fig. 1, element 4), and an actuator (Fig. 1, element 5), the droplet ejection head ejecting the liquid within the cavity through the nozzle in the form of droplets by driving the actuator by means of the driving circuit to change an internal pressure of the cavity while moving the plurality of droplet ejection heads relatively with respect to a droplet receptor by the reciprocating mechanism so that the ejected droplets land on the droplet receptor (Column 1, lines 9-14), the droplet ejection apparatus comprising:

- ejection failure detecting (Fig. 8, elements 21-26) means for detecting an ejection failure of the droplet ejected through each of the nozzles and a cause thereof (Column 6, lines 31-65);
- counting (Fig. 8, element 45) means for counting the number of ejection failures detected by the ejection failure detecting means (Column 11, lines 16-26); and

- recovery (Column 11, lines 1-10; Column 11, lines 46-50) means for carrying out recovery processing for the droplet ejection heads to eliminate the cause of the ejection failure of the droplet;
- wherein the ejection failure detecting means detects the ejection failure with respect to a droplet ejection operation of each droplet ejected through the nozzles when the plurality of droplet ejection heads eject the droplets onto the droplet receptor (Column 10, lines 56-60), and wherein, in the case where the number of ejection failures with respect to the droplet receptor counted by the counting means exceeds (Column 11, lines 46-50) a predetermined reference value (Fig. 8, element 41, i.e. $41 = 0$, Column 11, lines 31-32), the droplet ejection apparatus interrupts the ejection of the droplets onto the droplet receptor and make the recovery means carry out the recovery processing in accordance with the cause of the ejection failure (Fig. 8, element 41, i.e. $45 = \text{True}$, Column 11, lines 42-43).

With respect to claim 28, Yauchi discloses the reference value is changeable (Column 11, line 30, i.e. reset).

With respect to claim 29, Yauchi discloses the droplet ejection apparatus has a plurality of operation modes that respectively correspond to reference values different from each other, and is adapted to be able to select any one of the operation modes (Column 11, lines 46-50, i.e. printing or discontinued printing).

With respect to claim 30, Yauchi discloses the droplet ejection apparatus is adapted to confirm whether or not the ejection failure is eliminated through a detecting operation

by the ejection failure detecting means after the recovery means carried out the recovery processing in accordance with the cause of the ejection failure (Fig. 11; Column 13, lines 10-59).

With respect to claim 31, Yauchi discloses the detecting operation by the ejection failure detecting means for the confirmation is carried out at a droplet ejection operation in a flushing process for the nozzle (Fig. 11; Column 13, lines 10-59).

With respect to claim 32, Yauchi discloses the droplet ejection apparatus resumes the remaining ejection operation of the droplets onto the droplet receptor after carrying out the detecting operation by the ejection failure detecting means for the confirmation (Fig. 11; Column 13, lines 10-59).

With respect to claim 33, Yauchi discloses droplet receptor transporting means (Fig. 9) which carries out discharge and feed of the droplet receptor (Column 10, lines 56-60);

- wherein the droplet ejection apparatus is adapted to operate the droplet receptor transporting means to discharge the droplet receptor from and feed another droplet receptor to the droplet ejection apparatus to carry out a new and same droplet ejection operation with respect to the fed droplet receptor after carrying out the detecting operation by the ejection failure detecting means for the confirmation (Column 11, lines 46-50).

With respect to claim 34, Yauchi discloses in the case where the ejection failure is detected through the detecting operation by the ejection failure detecting means for the

confirmation, the recovery means carries out the recovery processing again (Column 3, lines 20-30).

With respect to claim 35, Yauchi discloses in the case where the recovery means carries out the recovery processing again when the ejection failure was detected through the detecting operation by the ejection failure detecting means for the confirmation, the recovery means carries out the recovery processing in accordance with the cause of the ejection failure (Column 33-45).

With respect to claim 38, Yauchi discloses each of the droplet ejection heads includes a diaphragm (Fig. 1, element 2) that is displaced when the actuator is driven, and wherein the ejection failure detecting means detects a residual vibration of the diaphragm (Fig. 3c, i.e. ink is coupled to Fig. 1, element 2 which is coupled to Fig. 1, element 5) and determines an ejection failure based on a vibration pattern of the detected residual vibration of the diaphragm (Column 6, lines 3-14).

With respect to claim 39, Yauchi discloses the ejection failure detecting means includes judging (Fig. 8, element 25) means for judging a cause of the ejection failure in the case where it is determined that there is the ejection failure of the droplets in the droplet ejection heads (Fig. 8, element 5) on the basis of the vibration pattern of the residual vibration of the diaphragm (Fig. 3a-3f).

With respect to claim 40, Yauchi discloses the vibration pattern of the residual vibration of the diaphragm (Fig. 1, element 2) includes a cycle of the residual vibration (Fig. 3a-3f).

With respect to claim 49, Yauchi discloses switching means (Fig. 8, element 23) for switching a connection of the actuator from the driving circuit to the ejection failure detecting means after carrying out the droplet ejection operation by driving the actuator (Column 6, lines 31-54).

With respect to claim 50, Yauchi discloses one or more ejection failure detecting means and one or more switching means;

- wherein the switching means corresponding to the droplet ejection head that has carried out the droplet ejection operation switches the connection of the actuator from the driving circuit to the corresponding ejection failure detecting means, and then the switched ejection failure detecting means detects an ejection failure of the droplets (Column 10, lines 56-60; Column 11, lines 46-50).

With respect to claim 51, Yauchi discloses the actuator includes an electrostatic actuator (Fig. 1, element 5; piezoelectric actuators are electrostatic).

With respect to claim 52, Yauchi discloses the actuator includes a piezoelectric actuator (Fig. 1, element 5) having a piezoelectric element and using a piezoelectric effect of the piezoelectric element.

With respect to claim 53, Yauchi discloses storage means (Column 10, lines 58-60) for storing a cause of the ejection failure of the droplets detected by the ejection failure detecting means in association with the nozzle for which the detection was carried out.

With respect to claim 54, Yauchi discloses the droplet ejection apparatus includes an ink jet printer (Fig. 9; Column 1, lines 9-14).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yauchi et al. (US 5,500,657) in view of Girones et al. (US 6,238,112 B1).

With respect to claim 36, Yauchi discloses the recovery means includes (Fig. 11): flushing means for carrying out a flushing process (Fig. 10, element 80) by which the droplets are preliminarily ejected through the nozzles by driving the actuator; and pumping means (Fig. 10, element 81) for carrying out a pump-suction process with the use of a pump connected to a cap that covers the nozzle surface of the droplet ejection heads (Column 12, lines 37-61).

With respect to claim 37, Yauchi discloses the causes of the ejection failure that the ejection failure detecting means can detect include: intrusion of an air bubble into the cavity (Column 2, lines 18-22); and wherein the recovery means carries out the pump-suction process by the pumping means in case of the intrusion of an air bubble (Fig. 10; Column 12, lines 37-61).

However, Yauchi fails to disclose:

- wiping means for carrying out a wiping process in which a nozzle surface of the droplet ejection heads where the nozzles are arranged is wiped with a wiper
- thickening of the liquid in the vicinity of the nozzle due to drying; and

- adhesion of paper dust in the vicinity of an outlet of the nozzle;
- the flushing process by the flushing means or the pump-suction process by the pumping means in case of the thickening of the liquid due to drying, and at least the wiping process by the wiper in case of the adhesion of paper dust.

Girones discloses an inkjet printing system (Fig. 1) where "The orifice plate of the printhead, tends to pick up contaminants, such as paper dust, and the like, during the printing process. Such contaminants adhere to the orifice plate either because of the presence of ink on the printhead, or because of electrostatic charges. In addition, excess dried ink can accumulate around the printhead. The accumulation of either ink or other contaminants can impair the quality of the output by interfering with the proper application of ink to the printing medium" (Column 1, line 64 – Column 2, line 5) and a cleaner service station (Fig. 2).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the cleaner service station disclosed by Girones in the inkjet recording system disclosed by Yauchi. The motivation for doing so would have been "The concepts disclosed herein for cleaning the printheads 60-66 apply equally to the totally replaceable inkjet cartridges, as well as to the illustrated off-axis semi-permanent or permanent printheads, although the greatest benefits of the illustrated system may be realized in an off-axis system where extended printhead life is particularly desirable" (Column 7, lines 22-27).

2. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yauchi et al. (US 5,500,657) in view of Isayama (US 4,034,380).

With respect to claim 41, Yauchi discloses the judging means (Fig. 8, element 25) judges that: an air bubble has intruded into the cavity in the case where the cycle of the residual vibration of the diaphragm is shorter than a predetermined range of cycle (Column 6, lines 3-14).

However, Yauchi fails to disclose:

- the liquid in the vicinity of the nozzle has thickened due to drying in the case where the cycle of the residual vibration of the diaphragm is longer than a predetermined threshold; and
- paper dust is adhering in the vicinity of the outlet of the nozzle in the case where the cycle of the residual vibration of the diaphragm is longer than the predetermined range of cycle and shorter than the predetermined threshold.

Isayama discloses an ink ejection apparatus for a printer where "A circuit is shown in FIG. 2 for extracting the oscillating component of the voltage across the plate 20, comparing the magnitude of the oscillating component with a predetermined value and producing an electrical signal when the magnitude of the oscillating component is above the predetermined value" (Column 3, lines 3-8) and the resulting curves (Fig. 6a-6c)

At the time of the invention, it would have been obvious to use the curves disclosed by Isayama for the detection apparatus disclosed by Yauchi. The motivation for doing so would have been "to provide an ink ejection apparatus comprising means for detecting a lack of ink or air bubbles in an ink chamber thereof" (Column 1, lines 37-40).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 27 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 4 and 5 of copending Application No. 10/797,595. Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter claimed in the instant application is fully disclosed in the copending application and is covered in the copending application since the copending application and the instant application are claiming the same subject matter as follows: Claim 27 in the instant application for a droplet ejection apparatus is covered by claims 4 and 5 respectively in the copending application as shown in Table 1 below.

Table 1

<u>Copending application 10/797,595</u>	<u>Instant application 10/797,594</u>
<p>4. A droplet ejection apparatus having a driving circuit, a reciprocating mechanism and a plurality of droplet ejection heads each including a cavity filled with a liquid, a nozzle communicated with the cavity, and an actuator, the droplet ejection head ejecting the liquid within the cavity through the nozzle in the form of droplets by driving the actuator by means of the driving circuit to change an internal pressure of the cavity while moving the plurality of droplet ejection heads relatively with respect to a droplet receptor by the reciprocating mechanism so that the ejected droplets land on the droplet receptor, the droplet ejection apparatus comprising: ejection failure detecting means for detecting an ejection failure of the droplet ejected through each of the nozzles; counting means for counting the number of ejection failures detected by the ejection failure detection means; and droplet receptor transporting means which carries out discharge and feed of the droplet receptor; wherein the ejection failure detecting means detects the ejection failure with respect to a droplet ejection operation of each droplet ejected through the nozzles when the plurality of droplet ejection heads eject the droplets onto the droplet receptor, and wherein, in the case where the number of ejection failures with respect to the droplet receptor counted by the counting means when the plurality of droplet ejection heads eject the droplets onto the droplet receptor exceeds a predetermined reference value, the droplet ejection apparatus stops the droplet ejection operation onto the droplet receptor, and operate the droplet receptor transporting means to discharge the droplet receptor from and feed another droplet receptor to the droplet ejection apparatus to carry out a new and same droplet ejection operation with respect to the fed droplet receptor.</p> <p>5. The droplet ejection apparatus as claimed in claim 4, further comprising recovery means for carrying out recovery processing for the droplet ejection heads to eliminate a cause of the ejection failure of the droplets; wherein the recovery means carries out the recovery processing before carrying out the new and same droplet ejection operation with respect to the fed droplet receptor.</p>	<p>27. A droplet ejection apparatus having a driving circuit, a reciprocating mechanism and a plurality of droplet ejection heads each including a cavity filled with a liquid, a nozzle communicated with the cavity, and an actuator, the droplet ejection head ejecting the liquid within the cavity through the nozzle in the form of droplets by driving the actuator by means of the driving circuit to change an internal pressure of the cavity while moving the plurality of droplet ejection heads relatively with respect to a droplet receptor by the reciprocating mechanism so that the ejected droplets land on the droplet receptor, the droplet ejection apparatus comprising: ejection failure detecting means for detecting an ejection failure of the droplet ejected through each of the nozzles and a cause thereof; counting means for counting the number of ejection failures detected by the ejection failure detecting means; and recovery means for carrying out recovery processing for the droplet ejection heads to eliminate the cause of the ejection failure of the droplet; wherein the ejection failure detecting means detects the ejection failure with respect to a droplet ejection operation of each droplet ejected through the nozzles when the plurality of droplet ejection heads eject the droplets onto the droplet receptor, and wherein, in the case where the number of ejection failures with respect to the droplet receptor counted by the counting means exceeds a predetermined reference value, the droplet ejection apparatus interrupts the ejection of the droplets onto the droplet receptor and make the recovery means carry out the recovery processing in accordance with the cause of the ejection failure.</p>

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is 571 272-2810. The examiner can normally be reached on 7am - 330pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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9/25/2006

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